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Dear Water Board Staff,

This letter provides the core documentation for submission of temperature data for the South Yuba River. We request that these data be addressed in the 2008 Integrated Report – List of Impaired Waters and Surface Water Quality Assessment [303(d)/305(b)]. The submitted data (described in this letter and provided by attachment) warrants a listing of the South Yuba River as impaired by high water temperatures This conclusion is evident upon evaluation of the data according to the State Water Resources Control Board's Water Quality Control Policy (section 6.1.5.9).

This letter is accompanied by the following attachments:

1. Excel file of SYRCL's monitoring data with handheld thermometers.
2. Excel file of SYRCL thermograph data from July, 2004.
3. Quality Assurance Program Plan for SYRCL's River Monitoring Program

Four sources of temperature data are available for the South Yuba River:

1. USGS data from gauge site 11417500 at Jones Bar.
2. Thermograph data acquired by consultants for the state-funded Upper Yuba River Studies Program: 12 sites during 2003-2004.
3. Thermograph data collected by SYRCL at Edward's Crossing in July, 2004.
4. Thermometer readings taken as part of SYRCL's River Monitoring Program; Monthly and occasional, 2001-2006.

The USGS data is partially available at http://waterdata.usgs.gov/nwis/inventory/?site_no=11417500. Charlie Alpers (cnalpers@usgs.gov; 916-278-3134) and other USGS staff may be submitting a more detailed and complete record of temperature. If not, please contact them for acquisition of the complete data set.

The most valuable source of temperature data from the South Yuba River was acquired in 2003-2004 by CH2MHill, consultants to the Upper Yuba River Studies Program (UYRSP). While SYRCL can not share this data due to stakeholder process agreements of the UYRSP, state employees administering this program can not deny requests to provide these data. The State Water Resources Control Board staff representative for the UYRSP is Rick Humphreys. The program manager is Tedd Frink of the Department of Water Resources: PO Box 942836, Sacramento, CA 94236; tfrink@water.ca.gov; (916) 651-9618. See the Reference section of this letter for a citation of the document

reporting temperature data (Nikirk 2006), and the assessment report that includes evaluation of relevant biological criteria (UYRSP 2006).

The UYRSP exists for the purpose of assessing the feasibility of restoring access to the South and Middle Yuba for salmon and steelhead. The large public expense of this program represents the value of the South and Middle Yuba as a restoration opportunity for these anadromous species listed as threatened with extinction. Resident Oncorhynchus mykiss (rainbow trout/steelhead) persist in the South Yuba despite a severe limitation to their productivity due to elevated water temperature. This letter evaluates temperature in the South Yuba with primarily with respect to O. mykiss.

Standard EPA temperature thresholds for O. Mykiss are 19 C (maximum weekly average) and 24 C (acute threshold) (Brungs and Jones 1977). Sullivan et al. (2000) reviewed temperature criteria for salmon and steelhead and developed a model for assessing risk of growth loss and suggest that a more appropriate criteria for O. mykiss may be 18 C and 21 C, respectively. According to McCollough (1999), Chinook salmon are more sensitive to temperature than O. mykiss. Even lower thresholds of impact apply to California red-legged frog (*Rana aurora draytonii*), a federal Threatened species known to inhabit the South Yuba. The northern red-legged frog has the lowest upper (21^{o}C) and lower (4^{o}C) lethal embryonic temperatures of any North American ranid frog (Licht 1971).

Thermograph data for one site on the South Yuba from July 21-26, 2004 are charted in Figure 1. These data were recorded at 30-minute intervals using an Onset brand Hobotemp placed in ambient river water. Other temperature probes placed in the South Yuba for this period were lost or destroyed. The maxima for this period was 27.8 C and the minima 23.1 C.

SYRCL's River Monitoring program involves monthly measurements of river temperature using a bulb spirit thermometers. A total of 13 sites have been established since the inception of the program in 2001 (Table 1). Sites 12 and 13 were established following the warmest months of 2006. The results of monthly temperature measurements (June through October only) are reported in Figures 2-7. These charts illustrate a rapid increase in temperature of the South Yuba from Site 9 (Langs Crossing is located immediately below Spaulding Dam) to Site 8 downstream. From Site 8 to Site 1 (located less than 1 mile above Englebright Resevoir), the South Yuba flows 30 miles and generally exceeds criteria for O. mykiss during the summer months. The acute threshold of lethality for O. mykiss (24 C) was exceeded in 2001, 2002, 2004, and 2005. These temperatures are almost certainly elevated as a result of less than 5% natural flow below Spaulding as an effect of the Drum-Spaulding and Yuba- Bear hydroprojects.

In the summers of 2002, 2003 and 2004, special sampling of the South Yuba was done to investigate the relationship between water temperature and bacteria. Table 2 reports these additional measurements of temperature, many of which greatly exceed the acute threshold of lethality for salmonids.

SYRCL's monitoring program follows a Quality Assurance Program Plan approved by the State Water Resources Control Board in 2004. This QAPP and SYRCL's entire set of River Monitoring data has been provided to Laurie Webber of the Central Valley Regional Water Quality Control Board. We would be happy to reissue these data in any format requested.

Please keep me informed of your assessment of the South Yuba, and allow me to know how I can be of further assistance.

Sincerely,

Gary Reedy

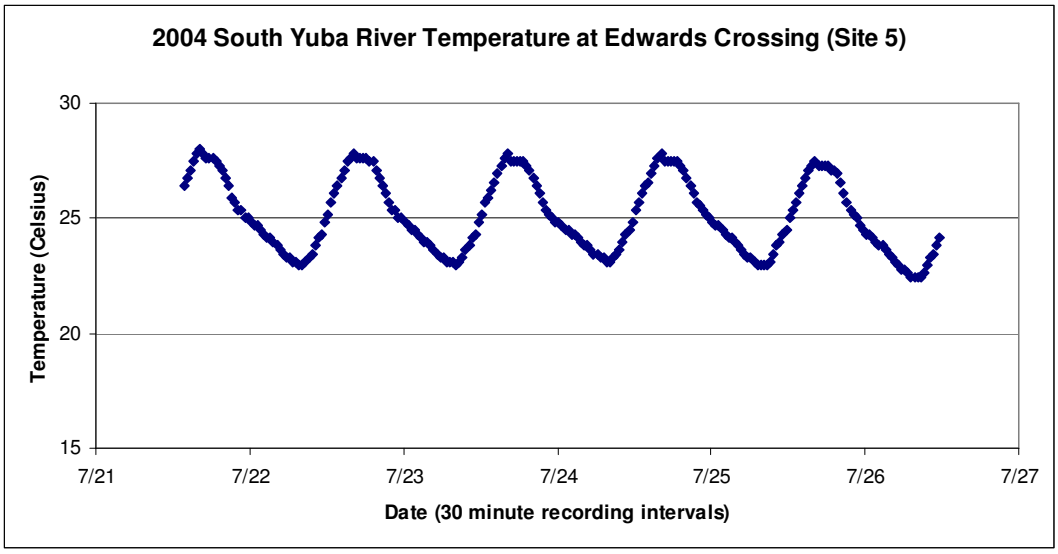

Figure 1. Thermograph from temperature probe data collected at Edward's Crossing on the South Yuba from July 21 to July 26, 2004.

Table 1. SYRCL monitoring sites on the South Yuba River.

Site	Location	Elevation	Coordinates
1	Bridgeport	533	655418E 4350803N
2	Jones Bar	1310	*
3	Hwy 49 Bridge	1210	664743E 4355619N
4	Purdon Crossing	1690	668311E 4354963N
5	Edwards Crossing	1939	673200E 4355619N
6	Below Humbug Creek	2100	678055E**
7	Above Humbug Creek	2120	678445E 4356151N
8	Keleher Campground	2736	690972E 4359137N
9	Langs Crossing	5490	702112E 4354902N
10	Near Indian Springs	5490	709102E 4356230N
11	Hampshire Rocks	5893	715726E 4354156N
12	Plavada Bridge	5690	707926E 4377611N
13	Van Norden Meadow	6118	720596E 4355086N

* no data available

** easting avail., no northing data

Table 2. South Yuba Temperatures.

Site	Date	Temperature C
3	7/29/2003	25.3
5	7/29/2003	26.4
2	7/31/2003	25.6
2	7/13/2004	24.2
4	7/13/2004	25.4
3	7/14/2004	21.3
5	7/14/2004	23.9
8	7/14/2004	21.9
10	8/10/2004	21.6

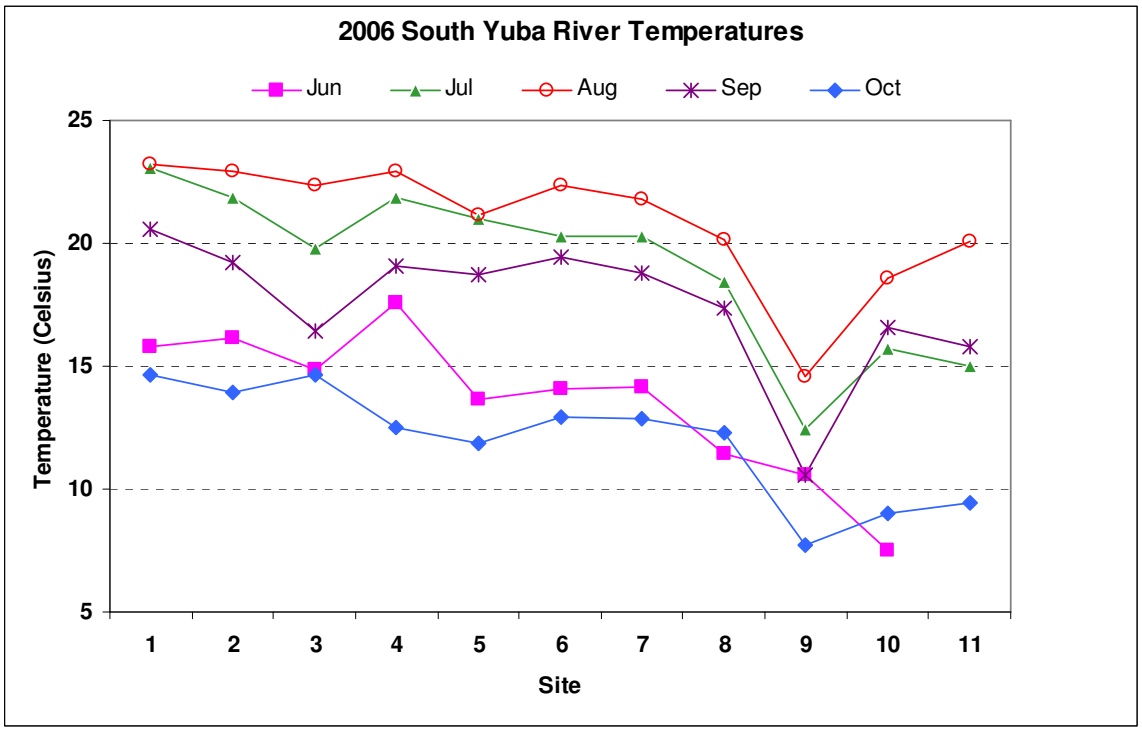

Figure 2.

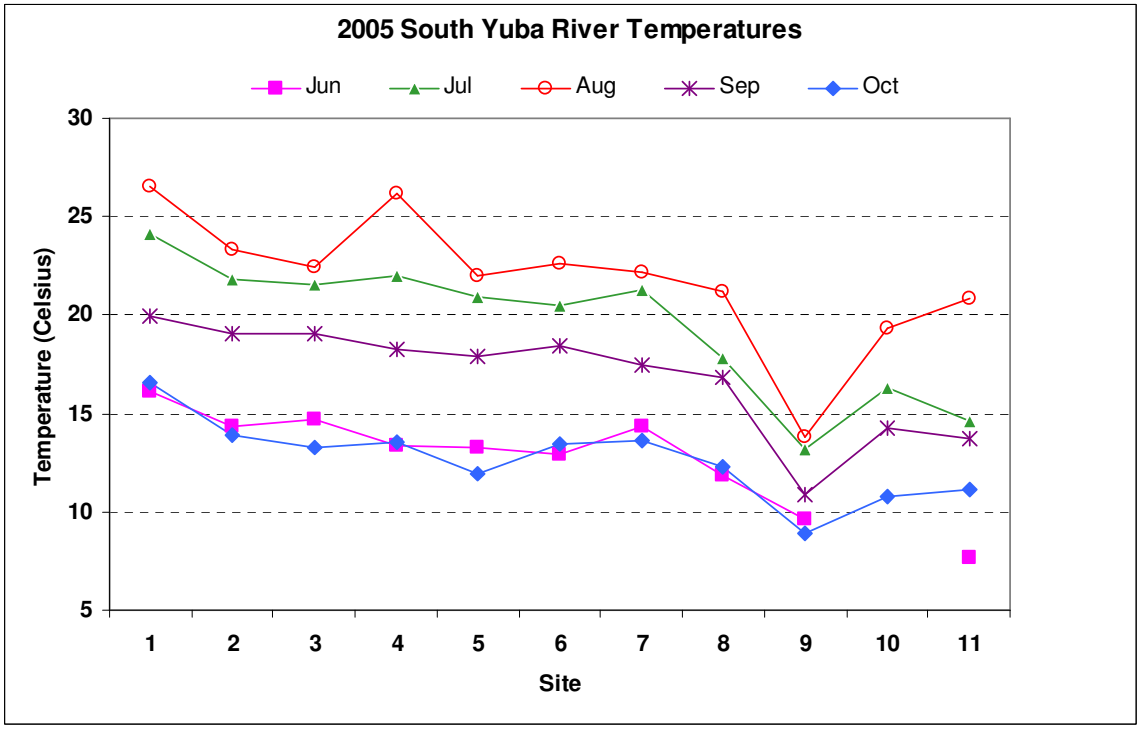

Figure 3.

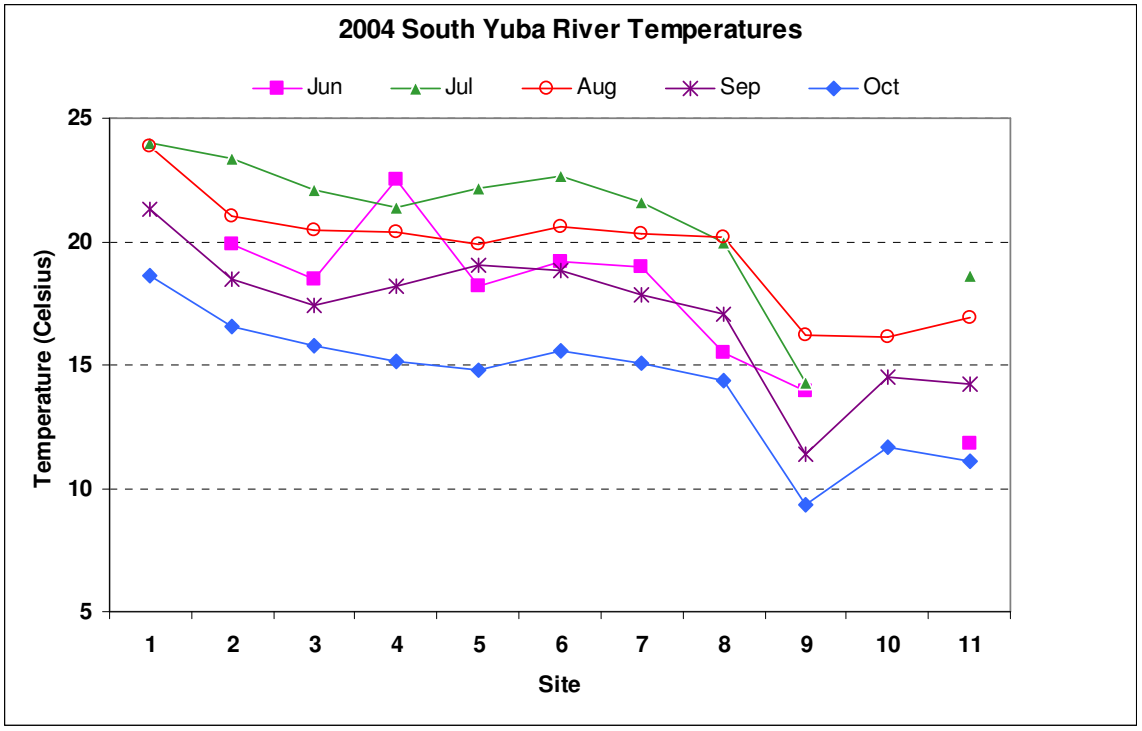

Figure 4.

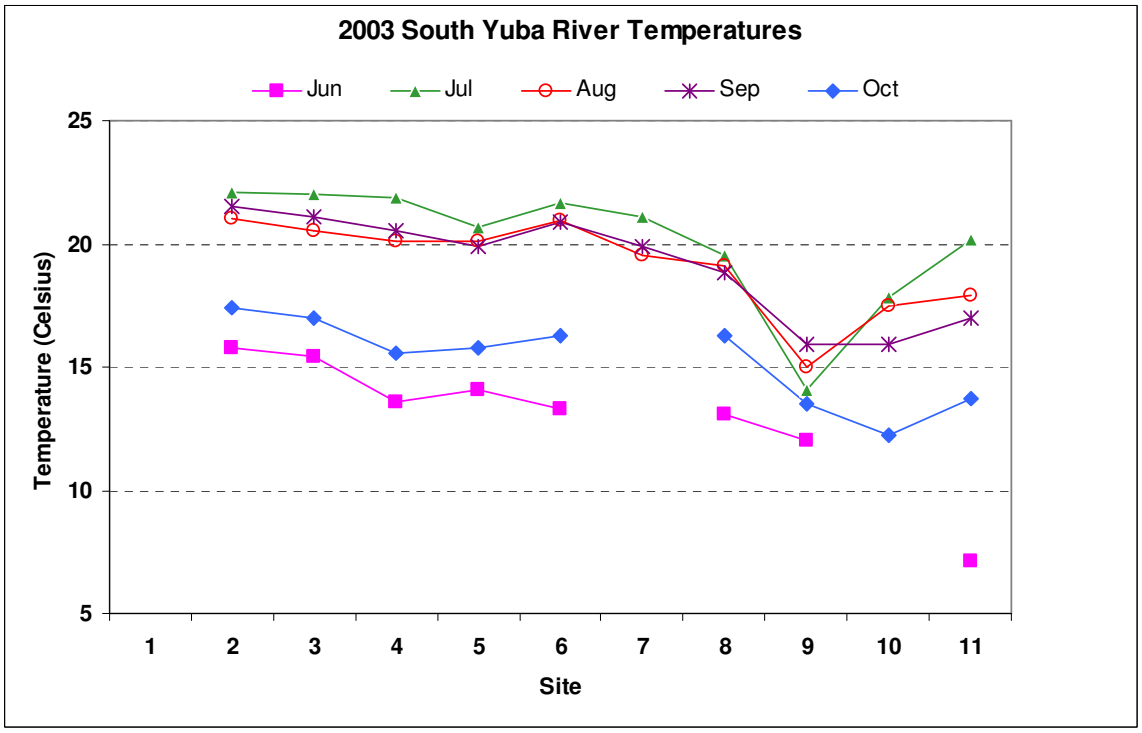

Figure 5.

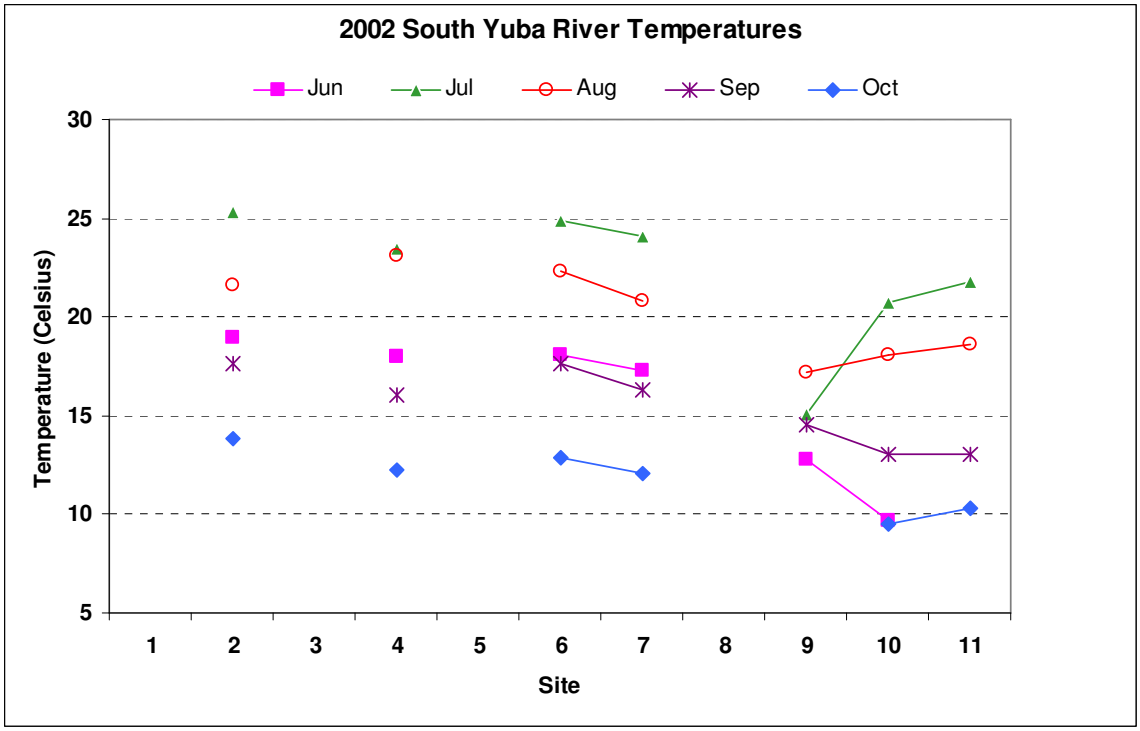

Figure 6.

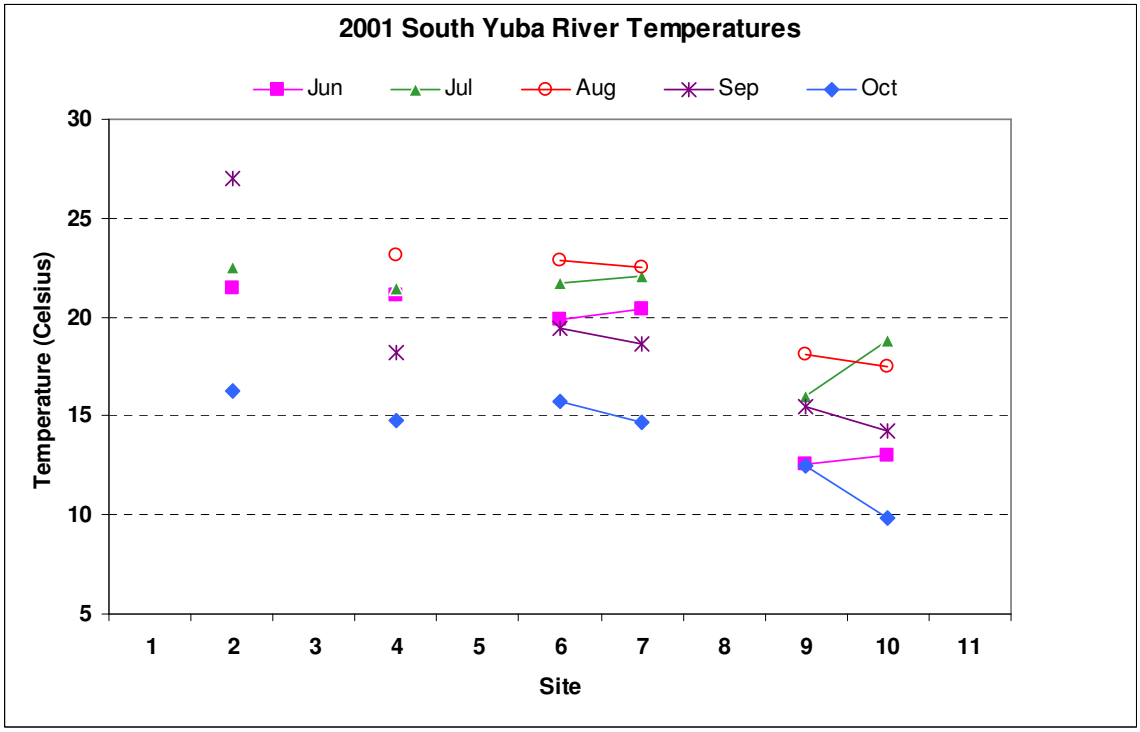

Figure 7.

Citations:

Brungs and Jones. 1977. Temperature criteria for freshwater fish: protocol and procedures. EcologicalResearch Series., U.S. Environmental Protection Agency, EPA-600/3-77-061. 130 pp.

Licht, L. E. 1971. Breeding habits and embryonic thermal requirements of the frogs, Rana aurora aurora and *Rana pretiosa pretiosa*, in the Pacific Northwest. Ecology 52 (1): 116124.

McCullough, D. 1999 . A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids, with Special Reference to Chinook Salmon. Columbia Intertribal Fisheries Commission, Portland, OR. Prepared for the U.S. Environmental Protection Agency Region 10. Published as EPA 910-R-99-010.

Sullivan, K., D.J. Martin, R.D. Cardwell, J.E. Toll, and S. Duke. 2000. An analysis of the effects of temperature on salmonids of the Pacific Northwest with implications for selecting temperature criteria. Sustainable Ecosystems Institute. Portland, OR. 192 pp.

Nikirk, Neil. April 14, 2006. Appendix F of the Upper Yuba River Watershed Chinook Salmon and Steelhead Habitat Assessment – Water Temperature Monitoring. Prepared by CH2MHill for the Department of Water Resources.

Upper Yuba River Studies Program Team. June 2006. Upper Yuba River Watershed Chinook Salmon and Steelhead Habitat Assessment – Technical Report. Prepared for the Department of Water Resources.